

From the INTERNATIONAL BUREAU

15 Nov. 2006

PCT

NOTIFICATION OF TRANSMITTAL  
OF COPIES OF TRANSLATION  
OF THE INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY  
(CHAPTER I OR CHAPTER II  
OF THE PATENT COOPERATION TREATY)  
(PCT Rules 44bis.3(c) and 72.2)

To:

GRIMM, Ekkehard  
Edith-Stein-Strasse 22  
63075 Offenbach/Main  
ALLEMAGNE

Date of mailing (day/month/year)

09 November 2006 (09.11.2006)

Applicant's or agent's file reference

240 680

## IMPORTANT NOTIFICATION

International application No.

PCT/EP2005/003110

International filing date (day/month/year)

23 March 2005 (23.03.2005)

Applicant

FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V. et al

## 1. Transmittal of the translation to the applicant.



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

## 2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

## 3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Ellen Moyse

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 240 680	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/EP2005/003110	International filing date ( <i>day/month/year</i> ) 23 March 2005 (23.03.2005)	Priority date ( <i>day/month/year</i> ) 24 March 2004 (24.03.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis.2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Date of issuance of this report 01 November 2006 (01.11.2006)</td> </tr> <tr> <td style="padding: 5px;">Authorized officer  Ellen Moyse  e-mail: pt05@wipo.int</td> </tr> </table>	Date of issuance of this report 01 November 2006 (01.11.2006)	Authorized officer  Ellen Moyse  e-mail: pt05@wipo.int
Date of issuance of this report 01 November 2006 (01.11.2006)			
Authorized officer  Ellen Moyse  e-mail: pt05@wipo.int			

# PATENT COOPERATION TREATY

TRANSLATION

From the  
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing **See form PCT/ISA/210**  
(day/month/year)

Applicant's or agent's file reference  
**240 680**

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No. <b>PCT/EP2005/003110</b>	International filing date (day/month/year) <b>23.03.2005</b>	Priority date (day/month/year) <b>24.03.2004</b>
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International Patent Classification (IPC) or both national classification and IPC  
**B23K26/073, B23K26/38**

Applicant  
**FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.**

1. This opinion contains indications relating to the following items:

- |                                     |              |  |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the opinion   |
| <input type="checkbox"/>            | Box No. II   | Priority   |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited  |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application   |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application  |

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Authorized officer
Facsimile No.	Telephone No.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2005/003110

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2005/003110

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-26	YES
	Claims		NO
Inventive step (IS)	Claims	1-26	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-26	YES
	Claims		NO

2. Citations and explanations:

1 Reference is made to the following document:

D1: PATENT ABSTRACTS OF JAPAN vol. 2003, no.  
12, 5 December 2003 (2003-12-05) & JP 2004  
066322 A (MAISUSHITA ELECTRIC IND CO LTD), 4  
March 2004 (2004-03-04)

2 Document D1 is considered to be the closest prior  
art. It discloses (the references between  
parentheses relate to said document) a

method of producing holes having a large aspect  
ratio in metallic materials as well as  
stratified metallic materials and those having  
at least one ceramic layer by means of laser  
radiation, wherein the intensity of the laser  
beam is set as a function of the required change  
in hole radius with the hole depth,

from which the subject matter of independent claim 1  
differs in that

the spatial distribution of the intensity in the  
laser beam, based on the varying base of the

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2005/003110

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement.

hole, is set such that the intensity  $I$  decreases within the section  $w_0$  with the distance  $w$  from the laser beam axis by the value  $\Delta I$ , this decrease is monotonous, and the values for the spatial change  $IM$  in the intensity  $I$  and the section  $w_0$  are set to be so large that a hole radius  $r_B$  larger than the section  $w_0$  ( $r_B > w_0$ ) is achieved, the section  $w_0$  being the radius of the laser beam.

- 2.1 The subject matter of claim 1 is therefore novel (PCT Article 33(2)). The problem addressed by the present invention can therefore be considered that of

completely expelling the melt during drilling in the direction of the incident laser radiation from the hole shaft is ensured without deposits of solidified melt at the hole edge.

This problem is solved, based on the method with the abovementioned features, in that the spatial distribution of the intensity in the laser beam, based on the varying base of the hole, is set such that the intensity  $I$  decreases within the section  $w_0$  with the distance  $w$  from the laser beam axis by the value  $\Delta I$ , this decrease is monotonous, and the values for the spatial change  $IM$  in the intensity  $I$  and the section  $w_0$  are set to be so large that a hole radius  $r_B$  larger than the section  $w_0$  ( $r_B > w_0$ ) is achieved, the section  $w_0$  being the radius of the

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2005/003110

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

laser beam. The section  $w_0$  is thus the radius of an area perpendicular to the laser beam axis obtaining 86% of the laser power.

- 2.2 The solution to this problem proposed in claim 1 of the present application involves an inventive step for the following reasons (PCT Article 33(3)):

The values for the spatial change  $\Delta I$  in the intensity  $I$  and the section  $w_0$  are set so large that a hole radius  $r_B$  larger than the section  $w_0$  ( $r_B > w_0$ ) is achieved.  $\Delta I$  and  $w_0$  should be selected to be so large that the hole is sufficiently wide for ensuring the abovementioned effect of not dissipating the laser beam through the upflowing melt.

- 2.3 Claims 2-26 are dependent on claim 1 and therefore likewise meet the PCT requirements for novelty and inventive step.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2005/003110

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 1 is not clear and does not meet the requirements of PCT Article 6 insofar as the subject matter for which protection is sought is not clearly defined. The following statements do not enable a person skilled in the art to determine which technical features are necessary for carrying out the stated function:

"that a hole radius  $r_B$  larger than the section  $w_0$  ( $r_B > w_0$ ) is achieved, the section  $w_0$  being the radius of the laser beam."